Extensible Markup Language

Opportunities & Challenges

Member -

Member -

Mark Crawford
Logistics Management Institute

Agenda

- ◆ Technical Specifications Status
- ◆ Business Standards Status
- ◆ Federal CIO Council

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Technical Specifications

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XML Specifications

- ◆ The Technical Specifications -
  - ➢ Are developed by the World Wide Web Consortium (W3C)
  - Provide a syntax for identifying, exchanging, and displaying data
  - Issued as W3C recommendations
  - Not submitted to accredited standards bodies

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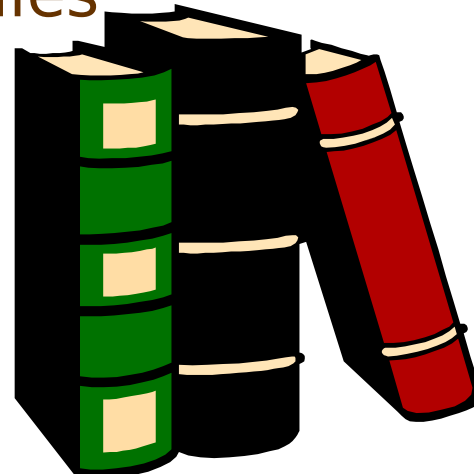
- ◆ Approved Recommendations
  - XML 1.0 Specification
  - Document Object Model (DOM) Level 1
  - Namespaces in XML
  - Associating Style Sheets with XML documents
  - XML Path Language
  - XML Transformation

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- ◆ Candidate Recommendations
  - ⬜ DOM Level 2 Specification Version 1.0

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XML Related Technical Specifications

- ◆ Working Drafts in Last Call
  - XML Schema Part 1: Structures
  - XML Schema Part 2: Data Types
  - Extensible Stylesheet Language (XSL) Version 1.0
  - XML Linking Language
  - XML Information Set

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XML Related Technical Specifications

- ◆ Working Drafts in development
  - ➢ XML Signature Syntax and Processing
  - ⛶ Canonical XML Version 1.0
  - ⛶ XML Query Data Model
  - ⛶ CSS3 introduction
  - ⛶ DOM Requirements
  - ⛶ CSS3 module: W3C selectors
  - ⛶ XML Schema Part 0: Primer
  - ⛶ XForms 1.0 Data Model
  - ⛶ XML Inclusions (Xinclude)
  - ⛶ XML Query Requirements
  - ⛶ Many others

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XML Business Standards

- The developing XML business standards provide the semantics
- The business standards use the syntax to
    - Define format
    - Define content
    - Define how information will be exchanged
- Are most properly based on well defined (modeled) processes and data relationships

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Federal Government and XML "Standards"

- Extensibility is boon and bane of XML technology
- Interoperability is threatened unless
  - agreement exists on which technical specifications to use
  - agreement exists on which business standards are used
- Cross agency issues need to be addressed
- Common approaches need to be developed
- CIO Council EIEIT Committee has chartered XML Work Group to address issues

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Business Standardization Initiatives

- OASIS
- RosettaNet
- X12 XML
- UN/EWG
- electronic business XML (ebXML)
- Others

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- Focus is to accelerate adoption of product independent specifications
- Recommends guidelines for product interoperability
- Works with key standards efforts
- Members include whose who of computer software and hardware industry
- Parent to XML.ORG
  - Open repository of XML DTD's and Schema's
- More at - http://www.oasis-open.org

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- ebXML
- DocBook
- XML Conformance
- XML Registry and Repository Technical Specification
- XSLT Conformance

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RosettaNet

- IT industry initiative to develop XML business standards
- Consists of -
  - IT Technical and Business Dictionaries
  - Partner Interface Process Specifications
- Participants include -
  - GSA
  - NIST
- Expanding to include Electronic Components industry with eye to others as well
- More at - http://www.rosettanet.org

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X12 XML Task Group

- ◆ X12 is accredited by ANSI to develop national EDI standards -
- ◆ Consists of representatives of virtually every Fortune 1000 company
- ◆ Experience in developing cross industry consensus on standardized business information exchanges
- ◆ XML in B2B is EDI
- ◆ X12 sees opportunity to leverage business information exchange expertise to develop cross-industry XML business standards

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◆ X/TG4 Tasks

- Propose policies and procedures that relate to X12 and XML, in collaboration with the Policies & Procedures Task Group

- Provide recommendations to the Steering Committee for interaction with external XML groups

- Develop a framework for common approaches to XML EDI development within X12

- Serve as the focal point within X12 on XML issues

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◆ Goals

- Foster recognition within ASC X12 and the business community that XML should be embraced as a means for conducting EDI

- Educate the business community to create an awareness of the need for a single XML Business standard

- Leverage X12 business expertise to develop global cross-industry harmonization utilizing XML technology

- Seek ANSI accreditation as the single cross-industry XML business standards body

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- ◆ XML work on hold pending ebXML delivery
- ◆ Focus of all new work is on data modeling
- ◆ Growing concern within membership to move forward on XML

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ebXML

- Joint UN/CEFACT & OASIS effort to develop XML technical framework
- Significant private sector involvement
- Requirements specification approved
- First draft Architecture, Registry & Repository, Transportation Routing & Packaging specifications out for comment
- Not focusing on XML business standards (at this time)
- Significant work still remains

Mark Crawford,

W3C Specifications Documentation
Text Encoding Initiative (TEI)
Channel Definition Format, CDF (Based on XML)
RDF Rich Site Summary (RSS)
Open Content Syndication (OCS)
W3C Document Object Model (DOM), Level 1 Specification
Web Collections using XML
Meta Content Framework Using XML (MCF)
XML-Data
Namespaces in XML
Resource Description Framework (RDF)
Australia New Zealand Land Information Council (ANZLIC) - Metadata
Alexandria Digital Library Project
ATLA Serials Project (ATLAS)
XML Metadata Interchange Format (XMI)-Object Management Group (OMG)
OMG Common Warehouse Metadata Interchange (CWMI) Specification
Object Management Group XML/Value RFP
MDC Open Information Model (OIM)
Educom Instructional Management Systems Project (IMS)
    Metadata Specification
Structured Graph Format (SGF)
Legal XML Working Group and UELP
XML Court Interface (XCI)
Georgia State University Electronic Court Filing Project
Web Standards Project (WSP)
HTML Threading - Use of HTML in Email
Open Software Description Format (OSD)
XLF (Extensible Log Format) Initiative
Apache XML Project
WAP Wireless Markup Language Specification
HTTP Distribution and Replication Protocol (DRP)
Chemical Markup Language
Molecular Dynamics [Markup] Language (MoDL)
Bioinformatic Sequence Markup Language (BSML)
BIOpolymer Markup Language (BIOML)
Virtual Hyperglossary (VHG)
Weather Observation Definition Format (OMF)
Open Financial Exchange (OFX/OFE)
Interactive Financial Exchange (IFX)
FinXML - 'The Digital Language for Capital Markets'
Extensible Financial Reporting Markup Language (XFRML)
Open Trading Protocol (OTP)
Financial Products Markup Language (FpML)
Mortgage Bankers Association of America XML Workgroup
Digital Property Rights Language (DPRL)
XML Digital Signature (Signed XML - IETF/W3C)
Digital Receipt Infrastructure Initiative
Digest Values for DOM (DOMHASH)
Signed Document Markup Language (SDML)
FIXML - A Markup Language for the FIX Application Message Layer
Bank Internet Payment System (BIPS)
smartX ['SmartCard'] Markup Language (SML)
Real Estate Transaction Markup Language (RETML)
OpenMLS - Real Estate DTD Design
ACORD - XML for the Insurance Industry
Customer Profile Exchange (CPEX) Working Group
Customer Support Consortium
XML for the Automotive Industry - SAE J2008
XML.ORG - The XML Industry Portal
X-ACT - XML Active Content Technologies Council
Electronic Business XML Initiative (ebXML)
Portal Markup Language (PML)
EDGARspace Portal
DII Common Operating Environment (COE) XML Registry
Open eBook Initiative
Mathematical Markup Language
Open Math Standard

OpenTag Markup
Metadata - PICS
MIX - Mediation of Information Using XML
CDIF XML-Based Transfer Format
Synchronized Multimedia Integration Language (SMIL)
Precision Graphics Markup Language (PGML)
Vector Markup Language (VML)
WebBroker: Distributed Object Communication on the Web
Web Interface Definition Language (WIDL)
XML/EDI - Electronic Data Interchange
XML/EDI Repository Working Group
European XML/EDI Pilot Project
EEMA EDI/EC Work Group - XML/EDI
ANSI ASC X12/XML and DISA
Information and Content Exchange (ICE)
CommerceNet Industry Initiative
eCo Interoperability Framework Specification
BizTalk Framework
eCo Framework Project and Working Group
Commerce XML (cXML)
RosettaNet
Open Catalog Protocol (OCP)
vCard Electronic Business Card
iCalendar XML DTD
XML Encoded Form Values
Capability Card: An Attribute Certificate in XML
Telecommunications Interchange Markup (TIM, TCIF/IPI)
aecXML Working Group - Architecture, Engineering and Construction
Product Data Markup Language (PDML)
Product Definition Exchange (PDX)
Electronic Component Information Exchange (ECIX) and
Pinnacles Component Information Standard (PCIS)
ECIX QuickData Specifications
ECIX Component Information Dictionary Standard (CIDS)
ECIX Timing Diagram Markup Language (TDML)
Encoded Archival Description (EAD)
UML eXchange Format (UXF)
XML Data Binding Specification
Translation Memory eXchange (TMX)
P3P Syntax Specification
Scripting News in XML
InterX.org Initiative
NuDoc Technology
Coins: Tightly Coupled JavaBeans and XML Elements
DMTF Common Information Model (CIM)
Universal Plug and Play Forum
Process Interchange Format XML (PIF-XML)
Ontology and Conceptual Knowledge Markup Languages
XOL - XML-Based Ontology Exchange Language
Procedural Markup Language (PML)
QAML - The Q&A Markup Language
LACITO Projet Archivage de données linguistiques
sonores et textuelles [Linguistic Data Archiving Project]
Astronomical Markup Language
Astronomical Instrument Markup Language (AIML)
GedML: [GEDCOM] Genealogical Data in XML
Newspaper Association of America (NAA) - Standard for
Classified Advertising Data 5.5
News Industry Text Format (NITF)
XMLNews: XMLNews-Story and XMLNews-Meta
NewsML and IPTC2000
Notes Flat File Format (NFF)
Java Help API
Cold Fusion Markup Language (CFML)
Document Content Description for XML (DCD)
XSchema

Document Definition Markup Language (DDML)
WEBDAV (IETF 'Extensions for Distributed Authoring and Versioning on the Web')
DAV Searching and Locating (DASL)
Graphic Communications Association - GCA 'Paper' DTD
DocBook XML DTD
Tutorial Markup Language (TML)
International Development Markup Language (IDML)
Call Processing Language (CPL)
Call Policy Markup Language (CPML)
VoiceXML Forum (Voice Extensible Markup Language Forum)
VoxML Markup Language
Telephony Markup Language (TML)
SABLE: A Standard for Text-to-Speech Synthesis Markup
Java Speech Markup Language (JSML)
SpeechML
TalkML
XML and VRML (Virtual Reality Modeling Language) - X3D
XML for Workflow Management [NIST]
SWAP - Simple Workflow Access Protocol
XML-Based Process Management Standard: Wf-XML
Theological Markup Language (ThML)
LitML: A Liturgical Markup Language
XML-F ('XML for FAX')
Extensible Forms Description Language (XFDL)
XML Forms Architecture (XFA)
Broadcast Hypertext Markup Language (BHTML)
IEEE LTSC XML Ad Hoc Group
IEEE Standard DTD
Open Settlement Protocol (OSP) - ETSI/TIPHON
Directory Services Markup Language (DSML)
WDDX - Web Distributed Data Exchange
Business Rules Markup Language (BRML)
Common Business Library (CBL)
Open Applications Group - OAGIS
Schema for Object-oriented XML (SOX)
XMLTP.Org - XML Transfer Protocol
The XML Bookmark Exchange Language (XBEL)
Simple Object Definition Language (SODL) and XMOP Service
Simple Object Access Protocol (SOAP)
XML and Music
Clinical Trial Data Model
Human Resource Management Markup Language (HRMML)
HR-XML Consortium
XML-HR Initiative - Human Resources
ECMData - Electronic Component Manufacturer Data Sheet Inventory Specification
Bean Markup Language (BML)
The Koala Bean Markup Language (KBML)
Jigsaw XML Format (JXML)
Chinese XML Now!
MOS-X (Media Object Server - XML)
FLBC (Formal Language for Business Communication) and KQML
ISO 12083 XML DTDs
Extensible User Interface Language (XUL)
User Interface Markup Language (UIML)
Process Specification Language (PSL) and XML
XML DTD for Phone Books
Using XML for RFCs
Schools Interoperability Framework (SIF)
Guideline XML (gXML)
Extensible Protocol
XML Belief Network File Format (Bayesian Networks)
Predictive Model Markup Language (PMML)
The Data Documentation Initiative (DDI)
XML and CORBA

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Issues

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- How do you sort through the competing interests involved in the process?
- How do you ensure your technical & business requirements are being addressed?
- Which technical specifications should you use?
- How do you move forward while ensuring reach back functionality with specifications still under development?
- How do you resolve varied use of other technical specifications?
- How do you choose when to use an approved specification? Draft specification?

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- ◆ Business standards
  - ➢ How many standard(s) can you support?
  - ➢ Which standards should you support?
  - ⬚ How do you preserve extensibility while supporting standards?
  - ➢ How do you meet the requirements of FIPS 161-2 and OMB Circular A-119?
  - ⬚ How do you resolve requirements to use DII COE XML repository with non-complaint commercial efforts?

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The Issues - XML Products

- How do you resolve low-cost promises and high-cost realities?
- What is the impact of XML application developers "extending" the syntax as well as the semantics?
- How do you determine what is best fit for your needs?
- What is the impact on interoperability?
- What impact does parser/server technology have on Performance and Design Methodology?
- What impact does product selection have on schema design?

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Background

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- ◆ Understand that XML -
  - ➢ Is not a silver bullet
  - ⬚ Is an integral part of your technology toolbox
- ◆ Understand that technology insertion alone does not improve your business processes
- ◆ Understand that to really succeed you must develop realistic, implementable information technology strategy that -
  - ⬚ uses Web/XML for appropriate interfaces
  - ⬚ addresses all interoperability issues
  - ⬚ is consistent across the enterprise
  - ⬚ is fully compliant with developing enterprise IT architecture

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Recommendations - Steps to Success

- Develop coordinated enterprise XML implementation approach
- Select appropriate opportunities to move forward
- Push for coordinated federal/agency approach
- Work with key XML business standards groups to incorporate data requirements

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- ◆ The heart of the XML 1.0 Specification consists of narrative, production rules, amplification, and examples
- ◆ Production rules are defined using Extended Backus-Naur Form (EBNF) notation
- ◆ Each production rule defines one symbol
  - ➢ symbol :: = expression

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- Narrative - provides textual description of production rules

    "A textual object is a well-formed XML document if:

    1. Taken as a whole, it matches the production labeled *document*.

    2. It meets all the well-formedness constraints given in this specification.

    3. Each of the parsed entities which is referenced directly or indirectly within the document is *well-formed*."

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◆ Production Rules - Provides technical representation of a specific component of the specification. Strict compliance to a production rule is required for creating well-formed or valid XML code

"**Document**
[1] document ::= prolog element Misc*"

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- Amplification - further explanation of the narrative and production rule(s) -

"Matching the *document* production implies that:

1. It contains one or more elements.

2. There is exactly one element, called the *root*, or document element, no part of which appears in the content of any other element. For all other elements, if the start-tag is in the content of another element, the end-tag is in the content of the same element. More simply stated, the elements, delimited by start- and end-tags, nest properly within each other.

As a consequence of this, for each non-root element C in the document, there is one other element P in the document such that C is in the content of P, but is not in the content of any other element that is in the content of P. P is referred to as the *parent* of C, and C as a *child* of P."

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Understanding XML 1.0

◆ Example - provides understandable representation of production rule

`<?xml version="1.0"?>`

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Understanding XML 1.0

- ◆ Section 1 - Introduction
- ◆ Section 2 - Documents
- ◆ Section 3 - Logical Structures
- ◆ Section 4 - Physical Structures
- ◆ Section 5 - Conformance
- ◆ Section 6 - Notation

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◆ Section 2 - Documents

  ➢ Defines physical characteristics and components of XML Documents

    2.1 - Well-Formed XML Documents

    2.2 - Characters

    2.3 - Common Syntactic Constructs

    2.4 - Character Data and Markup

    2.5 - Comments

    2.6 - Processing Instructions

    2.7 - CDATA Sections

    2.8 - Prolog and Document Type Declaration

    2.9 - Standalone Document Declaration

    2.10 - White Space Handling

    2.11 - End-of-Line Handling

    2.12 - Language Identification

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◆ Section 3 - Logical Structures
  ➢ Defines logical structure and components of XML documents
    3.1 - Start-Tags, End-Tags, and Empty-Element   Tags
    3.2 - Element Type Declarations
    3.3 - Attribute-List Declarations
    3.4 - Conditional Sections

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◆ Section 4 - Physical Structures

◌ Defines all aspects of entities

4.1 - Character and Entity References

4.2 - Entity Declarations

4.3 - Parsed Entities

4.4 - XML Processor Treatment of Entities   and References

4.5 - Construction of Internal Entity   Replacement Text

4.6 - Predefined Entities

4.7 - Notation Declarations

4.8 - Document Entity

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- X12
  - Address
    - Name
    - Street
    - City
    - State
- XML
  - \<Address\>
    - \<Name\>, \<Street\>, \<City\>, \<State\>
  - OR
  - \<Address: Name,Street,City,State\>

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